

REMARKS

Applicants have amended claims 1, 2, 10, and 11 and submitted new claims 12 - 17. Consequently, claims 1, 2, and 4-17 are pending.

Support for the amendment of claim 1 and claim 10 and new claims 14-17 regarding percentage conversion of ester to amide is provided by Applicants' original claim language and their specification at page 3, lines 24-31, page 4, lines 10-12 and page 5, lines 17-22.

These amendments and new claims concern the language "so that (a certain percentage range) of the ester groups of the acrylic acid alkyl ester units of the polymer are converted to CONH-R¹-Z groups" is Support for this claim language is found in the original claims recite that the polymer is an acrylic ester – acrylamide polymer. This description clearly indicates the reaction product of the amine and the acrylic ester moieties recited in the body of the claim. Also, at each of the above-cited specification passages, Applicants indicate that the amine reacts with the acrylic acid ester moiety to proceed in a manner analogous to transesterification (i.e., to make an amide instead of an ester) and eliminate alkanol (page 3); to produce amidisation (page 4) and to evolve alcohol (page 5). Those having an understanding of organic chemistry understand that these passages disclose the conversion of the ester group to an amide group.

Support for claims 12 and 13 is found at page 4, lines 21-24 of the specification.

Claim Rejections - 35 USC §112 paragraph 1

The PTO has rejected all pending claims under 35 USC §112 paragraph 1 as lacking "written description" for the term "heteroaryl." Applicants have amended their claims to re-insert the original term "heterocycle." Applicants submit that recitation of their original claim language overcomes this rejection. Consequently, Applicants respectfully request withdrawal of this rejection.

The PTO has also rejected claims 2 and 11 under 35 USC §112 paragraph 1 because these claims were amended to contain a numeric limitation of the subscript x associated with the polyoxyalkylene amine. Applicants have amended these claims to eliminate this numeric limitation. Applicants respectfully submit that the phrase polyoxyalkylene amine and the corresponding formula as presented in amended claims 2 and 11 are well known to those of skill in the art. An example of polyoxyalkylene amines is the commercial product Jeffamine® sold by the Huntsman corporation. A Huntsman monograph describing Jeffamines® obtained from

the internet is enclosed with this amendment. It is noted that the formula for Jeffamine® monoamines, i.e., polyoxyalkylene amines, uses the subscript x to indicate the various lengths of polyoxyalkylenes available. Consequently, Applicants submit that their original formula for their polyoxyalkylene amines which contains the subscript x is well-known and understood by those of skill in the art. It represents commercially available polyoxyalkylene amines such as the Jeffamine® series. Therefore, Applicants respectfully request withdrawal of this rejection.

The PTO has also rejected claim 2 and 11 as being indefinite because they recite improper Markush group language and the term “comprising” in connection with carbon chain length. Applicants have amended these claims to correct these errors. Applicants submit that these amendments overcome this rejection and respectfully request its withdrawal.

Claim Rejection - 35 USC §102(b)

The PTO has again rejected the pending claims under §102(b) as anticipated by EP 0 311 157, as evidenced by patent family members U.S. Pat. Nos. 5,688,858 and 4,302,561, of Elka-Chemicals BV.

The PTO asserts that example 4 of Efka “discloses compounds reading on at least [Applicant’s] claim 1.” Applicants respectfully disagree for the reasons given in their earlier amendment of November 27, 2006.

As a formality matter, Applicants note that example 4 of the Efka EP document is not the same as example 4 of U.S. patent No. 5,688,858¹. The EP example 4 discloses the polymerization of isobornyl methacrylate, styrene, 2-ethylhexyl acrylate and vinyl imidazole but does not include glycidyl methacrylate as an additional monomer. Also, the EP example 4 does not disclose any post polymerization modification with any amine such as 1-(3-aminopropyl) imidazole. In contrast, example 4 of the ‘858 patent does include glycidyl methacrylate as one of the monomer reactants and does perform a post polymerization reaction with 1-(3-aminopropyl) imidazole.

This comparison shows that the Efka EPO document and the ‘858 patent are not the same and cannot be used interchangeably for disclosure. Accordingly, the PTO cannot rely upon the

¹ In their earlier amendment, Applicants indicated that example 4 of the ‘858 patent and the Efka EP document were identical. Applicants had relied upon the PTO assertion to this effect. Upon further investigation, Applicants have found their reliance to be in error.

'858 patent as a disclosure of the text of Efka EP. In particular, the foregoing difference regarding Efka EP example 4 shows unequivocally that Efka BV (example 4 of Efka EP) does NOT "disclose compounds reading on at least claim 1 as the PTO has alleged."

Thus, the PTO rejection is improper inasmuch as the rejection reads "obvious over Efka EP as evidenced by patent family member Quednau, the '858 patent." The '858 patent cannot be used as evidence of the Efka EP disclosure because they differ.

Therefore, Applicants will address this rejection as if it were based solely upon the '858 patent and as if it were made under 35 USC §102e.

Applicants have already explained that the polymer made according to example 4 of the '858 patent contains a glycidyl side chain as well as carboxylic ester side chains. Applicants have explained that the competition of these two moieties for an amine such as 1-(3-aminopropyl) imidazole results in reaction of the glycidyl group with the amine to the exclusion of the reaction with the ester. Applicants have cited the well-known text *Advanced Organic Chemistry*, John Wiley, New York, 4th ed., 1992 by Jerry March as evidence of this preference. Moreover, Applicants have pointed to the 1:1 stoichiometric ratio of the glycidyl group to 1-(3-aminopropyl) imidazole to show that no excess amine remains after consumption by the glycidyl group. Consequently, Applicants have shown that the '858 patent example 4 does not describe the post polymerization conversion of side chain ester groups to amide groups as is required by Applicants' claims.

The PTO has criticized this argument because Applicants did not submit the referenced pages from March's text book.

Applicants therefore submit the relevant pages 416 and 423 plus title pages from March's text book. These pages show that amines react readily with epoxide groups but are relative unreactive with ester groups. Accordingly, in the '858 situation, the amine will react with the glycidyl group rather than the ester group.

Applicants also refer to col. 3, lines 1 – 55 of the '858 patent in support of this same indication. This passage discloses that addition of:

"heterocyclic groups with basic nitrogen atoms to the polymer chain (lines 1-7).

The compounds producing this addition include:

"compounds containing at least one basic nitrogen atom and capable of being attached to a polymer chain..." (lines 15-16).

The '858 specification provides numerous examples, all of which include basic amine heterocycled having an alcohol, amine, carboxylic acid or mercapto side chain (lines 28-45).

The '858 patent continues with the statement that:

“For use in the polymers according to the invention, it is necessary that these compounds contain at least one reactive group. This may be, for instance, -OH, -NH₂, -NHR, -COOH and -SH. In general a hydrogen atom reactive to epoxy or isocyanate is required. . . . It is of course also possible to operate without a coupling compound and to directly attach the heterocyclic groups-contain compound to the chain. The compounds polymerizable-in that are suited for this purpose are, e.g., 2-hydroxyethylacrylate, 2-hydroxypropylacrylate, glycidylmethacrylate, 2-hydroxyethylmethacrylate, 2-hydroxypropylmethacrylate, acrylic acid, methacrylic acid, alkoxylated -OH function reaction products thereof, etc.” (lines 46-63).

In each of these instances, the '858 patent thus indicates that the side chain groups of these acrylic compounds are the reactive moieties to which the alcohol, amine, carboxylic acid or mercapto group of the heterocyclic compound attach. The side chain groups include hydroxy alkyl and glycidyl. In particular, one of the units is glycidylmethacrylate as is taught by example 4. The question raised by the PTO in this contest is whether the heterocyclic compound will react with the glycidyl group or the acrylate ester group of this glycidylmethacrylate.

The foregoing quote from the '858 patent shows that the reactive group of the heterocycle must be reactive to epoxy or isocyanate. Thus, the '858 patent indicates that the amine will react with the glycidyl group rather than the ester group of that glycidylmethacrylate unit.

It follows that the very document cited by the PTO, the '858 patent, teaches that the reaction product of its example 4 is one in which the amine group of the 1-(3-aminopropyl)imidazole reacts with the glycidyl group, not the acrylate ester group. The result is a 1,2-hydroxyl amine side chain rather than an amide side chain as required by Applicants' claims.

Applicants submit therefore that the '858 patent generally and its example 4 in particular do not teach or suggest Applicants' polymer with its designated amide side chains. The polymer of example 4 of the '858 patent does not contain amide side chains but rather contain hydroxyl amine side chains and ester side chains.

The PTO has also criticized Applicants' argument regarding applicability of the '858 patent as not being reflected by an appropriate recitation in Applicants' claims. In other words, the criticism is that "the claims do not set forth what is the reaction product of the aminolysis reaction nor do the claims state the aminolysis must be between the acid ester and the amine to form an amide." See the current action at page 6.

Applicants have now amended their claims to indicate that the reaction product of the aminolysis is the amide product. As indicated above, Applicants' specification fully supports this amendment.

For these reasons, Applicants submit that their claims are patentable over the Efka EP document and over the '858 patent. Applicants respectfully request that the rejection be withdrawn.

Although the rejection over Emmons has been withdrawn, Applicants submit that Emmons does not teach or suggest an acrylic ester – acrylamide polymer in which the amide side chains are produced by conversion from ester groups and some of the acrylic ester groups have been transesterified with the long chain alcohols recited in claim 1 or in claim 10. Nor does Emmons teach or suggest percentages of ester to amide conversion.

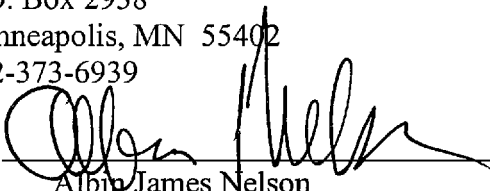
Conclusion

Applicant respectfully submits that the claims are in condition for allowance and notification to that effect is earnestly requested. The Examiner is invited to telephone Applicant's attorney 612-373-6939 to facilitate prosecution of this application.

If necessary, please charge any additional fees or credit overpayment to Deposit Account No. 19-0743.

Respectfully submitted,
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CERTIFICATE UNDER 37 CFR 1.8: The undersigned hereby certifies that this correspondence is being deposited with the United States Postal Service with sufficient postage as first class mail, in an envelope addressed to: Box AF, Commissioner of Patents, Washington, D.C. 20231, on this 20th day of July, 2007.

PATRICIA A. HULTMAN

Signature



Dated